



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,625	03/09/2004	Subbarao Surampudi	06816-023009/ CIT 2209 C4	4751
20985	7590	07/19/2006	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			KALAFUT, STEPHEN J	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/797,625

**Applicant(s)**

SURAMPUDI ET AL.

**Examiner**

Stephen J. Kalafut

**Art Unit**

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

Art Unit: 1745

Claims 26-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase “operating a direct fed methanol fuel cell which operates with an organic alcohol containing fuel” is unclear as to whether it would encompass alcohols other than methanol. If an alcohol other than methanol were used, would the fuel cell still be of the “direct methanol” variety?

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 26, 28, 29, 33 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloomfield (US 3,985,962).

Bloomfield discloses a fuel cell with a solid polymer electrolyte between an anode and a cathode (column 3, lines 28-37), in which the fuel may be methanol (column 9, lines 51-54). After passing through the cathode chamber (34), which is a portion of the fuel cell, the exhausted air proceeds through a line (52) and helps to drive a turbine (23), which would be a pressure-driven device. The cathode chamber, which is a portion of the fuel cell, would also be in contact with the air, which is a fluid used in the fuel cell, as well as the supply thereof. The operation of the fuel cell would involve supplying the air and methanol to the cell and carrying out an

Art Unit: 1745

electrochemical reaction therein. The turbine would recover some of the pressure of the outgoing air (column 5, lines 10-14).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27, 31 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa (US 5,134,043).

These claims differ from Bloomfield by reciting that the recovered pressure is used to drive another portion of the fuel cell, or to carry out another operation in the fuel cell. Nakazawa teaches the use of air exhausted from the cathode (2) to drive a turbine (12) that in turn powers a set of compressors (4, 6) for incoming air. This would be another portion of operation. Bloomfield also discloses a turbine (40) used to drive a compressor (38) for incoming air, this turbine not the same as the air exhaust turbine (23) mentioned above. However, because Bloomfield teaches the recovery of the energy of the air exhaust (column 5, lines 10-14), and because Nakazawa shows this air exhaust energy being used to compress incoming air (figure 14), it would be obvious to use the air exhaust turbine of Bloomfield to compress incoming air as shown by Nakazawa.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nadler (US 4,080,791).

This claim differs from Bloomfield by reciting that fluids are recovered after participating in an electrochemical reaction, and then fed back for a subsequent electrochemical reaction. This would be the recycling of exhausted reactants. Nadler discloses a methanol fuel cell (5) in which the methanol and the aqueous electrolyte it is dissolved in are recycled after being used (column 2, line 54 through column 3, line 6; figure 1). Thus, these fluids are recovered after an electrochemical reaction, and then fed back for a subsequent electrochemical reaction. Because this would allow more of the methanol to react within the fuel cell, and thus not be wasted, it would be obvious to use the methanol recycle arrangement of Nadler in the fuel cell system of Bloomfield, when methanol is used as the fuel.

Claims 30 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa as applied to claims 27 and 34 above, and further in view of Lance (US 4,517,259).

The above combination does not teach a fan driven by the recycled pressure, *i.e.*, the pressure recovered from the cathode exhaust. Lance discloses a fan (24) that is driven by a turbine (22), used to recirculate air for a fuel cell (12). Because the fan would perform the same function as the compressors disclosed by Bloomfield and Nakazawa, moving the air into a fuel cell, it would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa as applied to claim 26 above, and further in view of Elzinga (US 4,040,435).

The above combination does not teach that the methanol is free of free-acid electrolytes. Elzinga discloses a direct methanol fuel cell (10) in which the methanol is dissolved in an aqueous electrolyte that includes salts, such as both  $K_2CO_3$  and  $KHCO_3$ , which would be free of free-acid species (column 58-67). Because this would help control the partial pressure of the product  $CO_2$  and water vapor (column 4, lines 53-67), it would be obvious to use the electrolyte mixture of Elzinga in the fuel cell of Bloomfield, when methanol is used as the fuel.

Claims 1-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa and Elzinga.

Bloomfield discloses a fuel cell with a solid polymer electrolyte between an anode and a cathode (column 3, lines 28-37), in which the fuel may be methanol (column 9, lines 51-54). After passing through the cathode chamber (34), which is a portion of the fuel cell, the exhausted air proceeds through a line (52) and helps to drive a turbine (23). Since water is present in the cathode exhaust (column 6, lines 2-5), it would have been produced at the cathode, indicating a proton-conductive electrolyte. Bloomfield does not disclose that the turbine is driven by recycling pressure from one of the fluids in contact with the anode or cathode. Nakazawa teaches the use of air exhausted from the cathode (2) to drive a turbine (12) that in turn powers a set of compressors (4, 6) for incoming air. The turbine and compressor would constitute a pressure-recycling device. However, because Bloomfield teaches the recovery of the energy of the air exhaust (column 5, lines 10-14), and because Nakazawa shows this air exhaust energy being

Art Unit: 1745

used to compress incoming air (figure 14), it would be obvious to use the air exhaust turbine of Bloomfield to compress incoming air as shown by Nakazawa. This turbine would also be considered an expander, since the pressure drop therein would result in the gas gaining volume. Bloomfield and Nakazawa do not teach that the methanol is free of acid electrolytes. Elzinga discloses a direct methanol fuel cell (10) in which the methanol is dissolved in an aqueous electrolyte that includes salts, such as both  $K_2CO_3$  and  $KHCO_3$ , which would be free of acid electrolytes (column 58-67). Because this would help control the partial pressure of the product  $CO_2$  and water vapor (column 4, lines 53-67), it would be obvious to use the electrolyte mixture of Elzinga in the fuel cell of Bloomfield. While the turbines disclosed by Bloomfield and Nakazawa are driven by cathode exhaust, Elzinga teaches that gases are exhausted from the anode (column 3, lines 1-4) and are pumped into anode compartment (via pumps 12 and 15), which would mean that these gases also be pressurized, and that could be recycled. It would thus be obvious to couple the turbine to the anode gases. The liquid portion of the anode exhaust is diverted to a water reservoir (14), via a line (17), thus indicating a means for separating gas from liquid. The cathode is also in contact with a heat exchanger (20) that helps to condense water. The heat exchanger would thus constitute a water/air separator. Both the anode water line (17) and the heat exchanger are in contact with the water reservoir (14), which in turn is in contact with the anode chamber (10A) and its gases via a pump (15). This would form a water recycling part that feeds water back into the fuel cell anode for subsequent reactions.

Art Unit: 1745

Claims 12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa and Elzinga as applied to claims 11 and 13 above, and further in view of Nadler.

These claims differ from the above combination by reciting a vent for removing excess water, and a controller that monitors the system and allows the water to be vented when its amount becomes excessive. Nadler discloses a water purge as part of a heat exchanger (22) along the cathode exhaust of his fuel cell. This would allow excess water to be removed. Since excess water would dilute the fuel mixture of Elzinga discussed above, it would be obvious to add to the cathode water recycle system of Elzinga the water purge of Nadler. The use of controllers to monitor and control aspects of fuel cell operation is conventional in the art.

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa and Elzinga as applied to claim 6 above, and further in view of Lange.

Although Elzinga discloses a methanol pump (12), the above combination does not disclose a fan driven by the recycled pressure, *i.e.*, the pressure recovered from one of the fuel cell exhaust streams. Lance discloses a fan (24) that is driven by a turbine (22), used to recirculate air for a fuel cell (12). Because the fan would perform the same function as the compressors disclosed by Bloomfield and Nakazawa, moving the air into a fuel cell, it would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa.



Claims 18-24, 38-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa and Elzinga as applied to claims 1-11 and 13 above, and further in view of Solomon *et al.* (US 4,877,694).

These claims differ from the above combination by reciting that the anode includes a proton-conducting material, and that the cathode includes a gas diffusion material. Solomon *et al.* disclose gas diffusion electrodes useful for methanol oxidation (column 3, lines 5-7), and which include polymers having acid pendant groups (column 5, lines 20-22), which would thus be proton-conductive. Because these electrodes are useful for methanol oxidation, it would be obvious to use them as anodes in the fuel cell of Bloomfield, modified to include the methanol solution of Elzinga. Solomon *et al.* also teach gas diffusion electrodes as useful in air cathodes (column 2, lines 15-26). It would thus be obvious to use gas diffusion electrodes as the cathode of the fuel cell of Bloomfield, for reasons taught by Solomon *et al.*

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa, Elzinga and Solomon *et al.* as applied to claim 24 above, and further in view of Lance.

The pertinent points of Lance are stated above. It would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa, to send air to the gas diffusion cathodes disclosed by Solomon *et al.*

Art Unit: 1745

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield in view of Nakazawa, Elzinga and Solomon *et al.* as applied to claim 38 above, and further in view of Nadler.

The pertinent points of Nadler are stated above. It would be obvious to add to the cathode water recycle system of Elzinga the water purge of Nadler, the water recycle system being used with the fuel cell of Bloomfield.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 3-8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield and Nakazawa. The patented claims recite a direct liquid feed fuel cell comprising an anode, a cathode, and a solid hydrogen ion (*i.e.*, proton) conductive electrolyte, where the fuel

Art Unit: 1745

is free of an acid electrolyte, claim 6 further reciting methanol as a type of fuel. Each electrode would include its respective catalyst. The present claims differ by reciting device driven by one of the fluids in contact with an electrode, which recycles the pressure of the fluid. The device is recited in dependent claims to be a turbine or an expander, and to drive an air compressor.

Bloomfield discloses a fuel cell with a solid polymer electrolyte between an anode and a cathode (column 3, lines 28-37), in which the fuel may be methanol (column 9, lines 51-54). After passing through the cathode chamber (34), which is a portion of the fuel cell, the exhausted air proceeds through a line (52) and helps to drive a turbine (23), which would be a pressure-driven device. Nakazawa teaches the use of air exhausted from the cathode (2) to drive a turbine (12) that in turn powers a set of compressors (4, 6) for incoming air. This would recycle pressure from the outgoing air stream. Bloomfield also discloses a turbine (40) used to drive a compressor (38) for incoming air, this turbine not the same as the air exhaust turbine (23) mentioned above. These turbines would also be considered to each be an expander, since the pressure drop therein would result in the gas gaining volume. Because Bloomfield teaches the recovery of the energy of the air exhaust (column 5, lines 10-14), and because Nakazawa shows this air exhaust energy being used to compress incoming air (figure 14), it would be obvious to use the air exhaust turbine of Bloomfield to compress incoming air as shown by Nakazawa. Because Bloomfield contemplates solid polymer electrolytes and methanol as a fuel, it would be obvious to use the fuel cell of the patented claims with system of Bloomfield, modified according to Nakazawa.

Art Unit: 1745

Claims 2, 9-11 and 13 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield and Nakazawa, and further in view of Elzinga. These claims differ from the above combination by reciting the anode being in contact with the pressurized gas that drives the turbine, a water/air separator in contact with the anode, or a water recycling part that recycles water from the cathode exhaust to the anode. While the turbines disclosed by Bloomfield and Nakazawa are driven by cathode exhaust, Elzinga teaches that gases are exhausted from the anode (column 3, lines 1-4) and are pumped into anode compartment (via pumps 12 and 15), which would mean that these gases also be pressurized, and that could be recycled. It would thus be obvious to couple the turbine to the anode gases. The liquid portion of the anode exhaust is diverted to a water reservoir (14), via a line (17), thus indicating a means for separating gas from liquid. The cathode is also in contact with a heat exchanger (20) that helps to condense water. The heat exchanger would thus constitute a water/air separator. Both the anode water line (17) and the heat exchanger are in contact with the water reservoir (14), which in turn is in contact with the anode chamber (10A) and its gases via a pump (15). This would form a water recycling part that feeds water back into the fuel cell anode for subsequent reactions. Because these devices would help balance the water produced by and used in a methanol fuel, it would be obvious to use these devices as shown by Elzinga with the fuel cell of the patented claims, modified as stated above in view of Bloomfield and Nakazawa.

Claims 12, 14 and 15 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of

Art Unit: 1745

Bloomfield, Nakazawa and Elzinga, and further in view of Nadler. These claims differ from the above combination by reciting a vent for removing excess water, and a controller that monitors the system and allows the water to be vented when its amount becomes excessive. Nadler discloses a water purge as part of a heat exchanger (22) along the cathode exhaust of his fuel cell. This would allow excess water to be removed. Since excess water would dilute the fuel mixture of Elzinga discussed above, it would be obvious to add to the cathode water recycle system of Elzinga the water purge of Nadler. The use of controllers to monitor and control aspects of fuel cell operation is conventional in the art.

Claims 16 and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield and Nakazawa, and further in view of Lance. The above combination does not teach a fan driven by the recycled pressure, *i.e.*, the pressure recovered from one of the fuel cell exhaust streams. Lance discloses a fan (24) that is driven by a turbine (22), used to recirculate air for a fuel cell (12). Because the fan would perform the same function as the compressors disclosed by Bloomfield and Nakazawa, moving the air into a fuel cell, it would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa, used with the fuel cell of the patented claims.

Claims 18-21 and 24 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield and Nakazawa, and further in view of Solomon *et al.* The above combination does

Art Unit: 1745

not teach a gas diffusion cathode, or an anode that includes a proton-conductive material.

Solomon *et al.* disclose gas diffusion electrodes useful for methanol oxidation (column 3, lines 5-7), and which include polymers having acid pendant groups (column 5, lines 20-22), which would thus be proton-conductive. Because these electrodes are useful for methanol oxidation, it would be obvious to use them as anodes in the fuel cell of the patented claims, Solomon *et al.* also teach gas diffusion electrodes as useful in air cathodes (column 2, lines 15-26). It would thus be obvious to use gas diffusion electrodes as the cathode of the fuel cell of the patented claims, for reasons taught by Solomon *et al.*, the patented fuel cell modified according to the teachings of Bloomfield and Nakazawa.

Claims 22, 23, 38-40 and 42 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield, Nakazawa and Solomon *et al.*, and further in view of Elzinga. The pertinent points of Elzinga are stated above. It would further be obvious to use the water recycling part of Elzinga with the methanol fuel cell of the patented claims.

Claim 25 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield, Nakazawa and Solomon *et al.*, and further in view of Lance. The pertinent points of Lance are stated above. It would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa, used with the fuel cell of the patented claims, modified to include the electrode materials of Solomon *et al.*

Claim 41 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6 of U.S. Patent No. 5,599,638 in view of Bloomfield, Nakazawa, Elzinga and Solomon *et al.*, and further in view of Lance. The pertinent points of Lance are stated above. It would be obvious to use the fan of Lance in place of the air compressor of Bloomfield, driven by an exhaust air turbine as shown by Nakazawa, used with the fuel cell of the patented claims, modified to include the electrode materials of Solomon *et al.* and the water recycle part of Elzinga.

The disclosure is objected to because of the following informalities: In figure 2, the word "OXIDENT" is misspelled. Drawing numerals 206 (figure 3), 260 (figure 4), 305 (figure 5), 315 (figure 5), 318 (figure 5), 945 (figure 9) and 947 (figure 9) are not found in the specification. The numeral 604 does not appear in figure 6, as stated on page 27, line 19. On page 32, the numeral 944 is used to refer to both "fans" (line 18) and a "line" (line 28). Should the "line" instead be numbered 945? Appropriate correction is required.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Okano *et al.* (JP 62-064,067) disclose a fuel cell system using a turbine driven by combustion gas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

Art Unit: 1745

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

sjk

A handwritten signature in black ink, appearing to be 'SJK' with a stylized flourish.

STEPHEN J. RYAN  
PRIMARY EXAMINER  
GROUP 1700